

**REMARKS**

**Claims 1-2, 11 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Liou (US 5,086,197). Applicant traverses the rejection.**

First, even if one accepts the Examiner's characterization of the photodetectors taught in Liou as being elements of an imaging detector, it must be pointed out that the arrangement taught in Liou would correspond to two image detectors that form two one dimensional "images". The first "image" is formed by imaging elements 15' and 15 and photodiodes 16 and 16' and corresponds to an "image" of the grid pattern collapsed along a first axis. The second "image" is formed by imaging elements 13 and 13' and photodiodes 14 and 14' and is an "image" of the grid pattern collapsed along a second axis. In fact, Liou teaches that the outputs of elements 15 and 15' are treated separately from the outputs of 16 and 16'. Claims 1, 11, and 20 require that the displacement be obtained along two axes from two images. This could not be accomplished by comparing any two "images" taken by either detector taught in Liou, since each "image" is a one dimensional "image", and hence, can only provide information along one axis. Furthermore, if one were to chose one "image" from elements 15 and 15' and one image from elements 16 and 16', neither displacement could be determined, since it takes at least two "images" along an axis to provide a displacement measurement.

Second, Applicant submits that the signals produced by the apparatus taught by Liou are indicative of relative displacement i.e. the position of the imaging means relative to the grid pattern. The Examiner has not pointed to any teaching in Liou that the apparatus taught by Liou produces motion signals of any type. Claim 1 requires an integral optical motion detection circuit. The circuit taught in Liou generates a signal independent of the motion of the imaging means relative to the grid pattern. The circuit of Liou requires an external circuit to convert that signal to one that detects motion. Hence, the motion detection circuit is not integral to the apparatus of Liou.

Third, Claims 1 and 11 require that images are acquired at a specified rate. The apparatus taught by Liou does not acquire images at a specified rate. The Examiner asserts that, as "all imagery apparatuses operate at some kind of frequency at which the images are updated", the apparatus taught by Liou must also be acquiring images at a specified rate. Applicant respectfully disagrees. The Examiner has not pointed to any teaching in Liou

concerning the existence of any clock or timing circuit that would control the acquiring of images at a constant rate. Liou teaches an apparatus that produces signals "which conform to a conventional and standard encoder" (column 3, lines 65-66). Encoder signals of a conventional and standard type are not generated in a sequence of discrete "images". The signals are the potential across a photodiode which vary continuously with the light intensity. The signal is output in a continuous manner. That is, the signal is not sampled at a discrete rate. In fact, the apparatus of Liou would not operate properly if the output of the photodiodes was sampled at a finite rate, since the apparatus could move an integer number of grid periods between samplings, and hence, the apparatus would appear to have remained stationary.

Fourth, Claims 1, 11, and 20 require that "said optical motion detection circuit is operable to detect said detectable texture without requiring an integral illumination source." The Examiner suggests that Liou teaches an apparatus that would work without requiring an integral illumination source because "having the light 10' below the surface with a translucent grid pad 11 is an option without requiring a light source inside the device." Applicant must point out that Figure 1 shows, and the text specifically describes (column 2 lines 44-45), the apparatus taught by Liou as including a light source 10 or 10'. The fact that the source 10' is positioned outside part of one part of the apparatus does not mean that it is not an integral part of the apparatus. The apparatus taught by Liou would simply not function without an integral source, whether situated on one side of the grid in reflective mode, or on the other side of the grid in transmissive mode.

Claim 20 requires that the determination of the change in position includes shifting the second frame relative to the first frame along one axis and computing correlation values for the two frames. The Examiner has not pointed to any teaching in Liou that the apparatus taught therein shifts one of the "images" relative to another of the "images" followed by the computation of a correlation value between the shifted image and the unshifted image.

Accordingly, Applicant submits that Claims 1, 11, and 20 and the claims dependent therefrom are not anticipated by Liou.

**The Examiner rejected Claims 4 and 21 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Lauffenburger, et al (hereafter "Lauffenburger")(US 6,963,059). Applicant traverses the rejection.**

Applicant repeats the arguments made above with respect to the missing element in the teachings of Liou with respect to Claims 1 and 20 from which the rejected claims depend. Lauffenburger does not provide the missing teachings.

Regarding Claim 4, the Examiner first admitted that Liou fails to teach a supplemental light source operable to provide additional illumination onto said illuminated surface in response to said optical motion detection circuit detecting insufficient illumination of said illuminated surface. The Examiner looked to Lauffenburger for the missing teachings. Then, in response to Applicant pointing out that Lauffenburger actually teaches controlling the output of a single light source rather than the use of a supplemental source, the Examiner's position changed to suggest that Liou does teach "the possibility of having two light sources 10 and 10' as shown in Figs. 1-2". The Examiner now claims that "Lauffenburger was only used to teach that one of the light sources taught by Liou could be made to have its power, i.e. light illumination, increased if a detected illumination was deemed too low, which would improve accuracy in the optical navigation of the device if the other light source were to become inactive."

Applicant disagrees with the Examiner's new reading of Liou and with the Examiner's rationale for the combination. First, Liou teaches the use of either source 10 or source 10", not both, with the choice depending on whether the grid pad is reflective or transmissive. Second, even if both sources of Liou were to be used, and if Lauffenburger's technique of increasing the power of one source were applied, this would still not cover the limitation in Claim 4 of providing a supplemental light source. Hence, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claim 4. Hence, there are additional grounds for allowing Claim 4.

**The Examiner rejected Claims 5, 8, 13 and 16 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Mumford (US 6,377,249). Applicant traverses the rejection.**

With respect to Claims 5, 8, 13, and 16, Applicant repeats the arguments made above with respect to Claims 1 and 11 regarding the missing teachings in Liou. The Examiner has not pointed to any teaching in Mumford that provides the missing teachings in question. Hence, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to the rejected claims.

With respect to Claims 8 and 16, the Examiner states that Liou fails to teach the limitation that the illuminated surface includes a liquid crystal display and said detectable texture comprises pixels of said liquid crystal display. The Examiner looks to Mumford as providing the missing teaching. In response to Applicant's arguments regarding lack of motivation to combine the references, the Examiner stated that the Mumford reference was cited "to teach of a light pen system in which the surface that is detected is a liquid crystal device to show that the surface used for detection in the Liou reference could be made to be a liquid crystal surface in order to provide a light pen system in which the writing/detection tablet is not physically separated from the display screen." However, the Examiner has not pointed to any suggestion in the art that would cause someone of ordinary skill to combine the teachings of Liou and Mumford to arrive at a device that satisfies the limitations of Claims 5 and 16. In fact, if anything, one would be led in the opposite direction. The surface used in Liou must have a fixed, repeatative, pattern having a particular structure. While a liquid crystal display could generate such a pattern, there is no advantage in using an expensive liquid crystal display to generate a fixed pattern that is available from a simple transparency or printed pattern on a reflective surface. Furthermore, if one used the liquid crystal display to generate the pattern, the display would not be available to display an image on which the light pen is used to identify specific points. Furthermore, the Examiner has not shown that the inherent pattern in a liquid crystal display created by using the pixel circuitry as the pattern would function in the apparatus of Liou. Accordingly, there are additional grounds for allowing Claims 8 and 16.

**The Examiner rejected Claims 6 and 14 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Minn (US 4,56,947). Applicant traverses the rejection.**

First, Applicant repeats the arguments made above with respect to the missing teachings in Liou with respect to Claims 1 and 11. Minn does not provide the missing teachings. Hence, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claims 6 and 14.

In making this rejection, the Examiner stated that Liou fails to teach an apparatus wherein said illuminated surface is a cathode ray tube and wherein said detectable texture is a shadow mask of said cathode ray tube. The Examiner looked to Minn to provide the missing teachings.

First, Applicant must disagree with the Examiner's reading of the Minn reference. Minn teaches a light pen that operates on the surface of a cathode ray tube having a shadow mask; however, the light pen of Minn does not detect the shadow mask. The light pen of Minn determines the position of the light pen by reading out the x and y coordinates of the spot on the cathode ray tube when the light pen detects light. This is a conventional light pen arrangement. Furthermore, it would operate on a tube that lacks a shadow mask. Minn is directed to providing a better phosphor composition for the surface of the tube. There is no teaching in Minn of reading the shadow mask.

Second, the Examiner has not pointed to any reason that one would want to use the apparatus of Liou on the surface of a cathode ray tube. As noted above, the system taught in Liou depends on the surface having a specific grid pattern. The Examiner has not pointed to any teaching that the grid pattern in question can be provided by the shadow mask. In fact, it should be noted that the shadow mask on a cathode ray tube is not a grid pattern of parallel lines as required by the apparatus of Liou, and hence, there is no reasonable expectation of success in making the alteration suggested by the Examiner. Furthermore, the device taught by Liou would not function properly if there was also an image on the cathode ray tube, since light from that image would also be condensed onto the detectors and interfere with the operation of the detectors.



Finally, one could program the cathode ray display to project that grid pattern. However, there is no advantage in doing so. The cost of a cathode ray display is much higher than an illuminated transparency as taught in Liou.

The Examiner attempts to overcome these arguments by arguing that Minn is only cited to show that the surface used for detection in the Liou reference could be made to be a CRT surface. However, as pointed out above, one could not merely replace the surface of Liou with a CRT surface and expect the system to work absent additional teachings and, even then, the cost would argue against making the alteration. "The mere fact that a reference could be modified to produce the patented invention would not make the modification obvious unless it is suggested by the prior art." (*Libbey-Owens-Ford v. BOC Group*, 4 USPQ 2d 1097, 1103). "When the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the reference" (*In re Rijckaert*, 28 USPQ2d, 1955, 1957). Applicant submits that there would be no motivation to combine the teachings of Liou and Minn in the way required to meet the limitations of Claims 6 and 14. Accordingly, there are additional reasons for allowing these Claims.

**The Examiner rejected Claims 7 and 15 under 35 U.S.C. 103(a) as being unpatentable over Liou (in view of Ditzik (US 5,771,039). Applicant traverses the rejection.**

Initially, Applicant repeats the arguments made above with respect to the missing teachings in Liou with respect to Claims 1 and 11. Minn does not provide the missing teachings. Hence, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claims 7 and 15.

In making this rejection, the Examiner stated that Liou fails to teach an apparatus where the illuminated surface is a liquid crystal display and wherein said detectable texture is a diffuser plate of said liquid crystal display. The Examiner looked to Ditzik to supply the missing teachings.

First, there is no teaching in Ditzik that the diffuser plate has a detectable texture that could be detected optically or by any other means. Applicant respectfully submits that the Examiner has burden of showing that the diffuser plate taught in Ditzik has such a texture.

Second, even if the diffuser plate were carefully chosen to have a detectable texture, that texture would need to have the specific pattern of the grid lines taught in Liou. Such a pattern would not be chosen for a plate required to operate as a diffuser plate for a liquid crystal display, since it would lead to artifacts in the image produced by the display.

Third, even if a diffuser plate with a grid pattern were to be used, that pattern would only be visible when the pixels are open. Consider the case in which the apparatus of Liou is positioned over an open pixel, showing part of the diffuser plate with the required pattern. During the normal operation of the display, the pixel opens and closes in each display cycle, the time that the pixel is open depending on the brightness of that pixel in the image being displayed. When the pixel closes, the pattern would disappear. The device of Liou could not distinguish between adjacent pixels that open and close while the navigation device remains fixed and a movement of the navigation device across the grid during a period in which the pixels remain open. Hence, the apparatus of Liou would still not be operative.

In response to Applicant's argument on the lack of motivation to combine the references, the Examiner stated that the Ditzik reference was cited "to teach of an apparatus for use with a light pen in which the surface that is detected is a liquid crystal display in which the detectable texture is that of the diffuser plate to show that the surface used for detection in the Liou reference could be made to be a liquid crystal display surface in order to provide a light pen system in which the writing/detecting tablet is not physically separated from the display screen." As noted above with regard to Claims 6 and 14, Applicant must point out that it is the burden of the Examiner not only to show that teachings from the two references could possibly be combined but to show that there would be a motivation to do so with some expectation of success. Applicant submits that there would be no motivation to combine the teachings of Liou and Ditzik in the way required to meet the limitations of Claims 7 and 15. Hence, there are additional reasons for allowing these Claims.

**The Examiner rejected Claims 9, 10, 17, and 18 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Burns (US 5,442,147). Applicant traverses the rejection.**

Applicant repeats the arguments made above with respect to the missing teachings in Liou with respect to Claims 1 and 11. The Examiner has not pointed to any teachings in Burns that provide the missing teachings. Hence, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claims 9, 10, 17 and 18.

With respect to Claims 10 and 18, the Examiner admits that Liou fails to teach the semi-transparent layer with unique positioning information providing absolute position information. The Examiner looks to Burns for the missing teachings. Applicant submits that the issue is not whether Burns teaches a semi-transparent layer with a unique pattern for absolute navigation, but whether such a pattern could be used in the apparatus of Liou. Applicant points out that the apparatus taught by Liou requires a repetitive pattern, namely, a rectilinear grid having a specific relationship between the width of the dark and light regions, in order to function. The pattern in the layer taught by Burns would not comply with this requirement, and so the combination would not be operative.

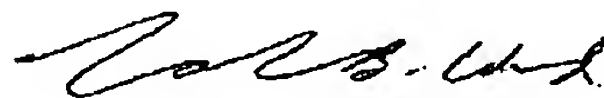
The Examiner states that Burns was cited only "to show that that illuminated surface is overlaid with a semi-transparent layer comprising a detectable pattern with absolute position indication. The Examiner never stated that the actual pattern of Burns would be used in place of the pattern of Liou, but that the idea of having an overlay could be used such that optical navigation could be provided on a surface or a display in which there was no pre-existing surface already on it." As noted above with regard to Claims 6 and 14, Applicant must point out that it is the burden of the Examiner not only to show that teachings from the two references could possibly be combined but to show that there would be a motivation to do so with some expectation of success. Applicant submits that there would be no motivation to combine the teachings of Liou and Burns in the way required to meet the limitations of Claims 10 and 18. Hence, there are additional reasons for allowing these Claims.



Claims 3, 12 and 22 were allowed.

I hereby certify that this paper is being sent by FAX to 571-273-8300.

Respectfully Submitted,



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